APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/401,676	09/22/1999	HENRY ESMOND BUTTERWORTH	UK999-027	4983

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EXAMINER
LAFORGIA, CHRISTIAN A

ART UNIT	PAPER NUMBER
2131	

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _05 May 2004_.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-14_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-14_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   In view of the Appeal Brief filed on 05 May 2004, PROSECUTION IS HEREBY

REOPENED. New grounds of rejection are set forth below.

2.   To avoid abandonment of the application, appellant must exercise one of the following

two options:

        (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37

CFR 1.113 (if this Office action is final); or,

        (2) request reinstatement of the appeal.

3.   If reinstatement of the appeal is requested, such request must be accompanied by a

supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or

other evidence are permitted. *** 37 CFR 1.193(b)(2).

4.   Claims 1 through 14 are presented for examination.

Claim Rejections

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   The text of those sections of Title 35, U.S. Code not included in this action can be found

in a prior Office action.

7.   Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No.

5,274,823 to Brenner et al., hereinafter Brenner.

8.   As per claims 1, 5, and 10, Brenner teaches a method for processing work items in a data

processing system comprising:

generating an interrupt in response to receipt of a work item in the system (column 1,

lines 37-50, column 3, line 19-42, i.e. "interrupt level code processes exceptions generated as

interrupts from the various resource," "a new interrupt is raised and handled by CPU3 120.

assuming the interrupt required the same resource as interrupt 110, interrupt 120 is added to the

queue for deferred processing and CPU3 goes on to other work");

servicing the generated interrupt to schedule a task for later processing of the work item,

without re-enabling the interrupt (column 3, line 19-42, column 4, lines 8-22 i.e. "a new interrupt

is raised and handled by CPU3 120. assuming the interrupt required the same resource as

interrupt 110, interrupt 120 is added to the queue for deferred processing and CPU3 goes on to

other work," "interrupts are disabled");

subsequently executing the task to process the work item (column 3, lines 37-41, column

4, lines 27-38, i.e. "if deferred items exits [on the deferred interrupt queue], the first is removed

and processed"); and,

speculatively scheduling a further task for processing of any work items that are

subsequently received in the system (Figure 3, column 4, lines 11-22, column 3, line 19-42, i.e.

"deferred interrupt queue...maintains interrupts in the order received," "a new interrupt is raised

and handled by CPU3 **120**. assuming the interrupt required the same resource as interrupt **110**,

interrupt **120** is added to the queue for deferred processing and CPU3 goes on to other work").

9.   Regarding claims 2, 6, and 11, Brenner teaches executing the speculatively scheduled

task to process any work items received by the system (column 4, lines 22-39, i.e. "process

executes to completion....at completion, the system checks the deferred queue whether or not

deferred interrupts exist");

on a determination that there are no work items to be processed, enabling the interrupt

(column 4, lines 22-39, i.e. "if none exist [interrupts on the deferred interrupt queue], the

blocking lock is released and the process is terminated, permitting any blocked process level

work to be resumed" and allowed to be blocked by interrupts again); and,

on a determination that there are work items to process, speculatively scheduling a further

task, without re-enabling this interrupt (column 3, line 19-42, column 4, lines 8-39, i.e. "if

deferred items exist [interrupts on the deferred interrupt queue]," "a new interrupt is raised and

handled by CPU3 **120**. assuming the interrupt required the same resource as interrupt **110**,

interrupt **120** is added to the queue for deferred processing and CPU3 goes on to other work,"

"interrupts are disabled).

10.   With regards to claims 3 and 7, Brenner teaches the work items are managed on a queue

(column 4, lines 7-23, i.e. "the deferred interrupt queue").

11.   Regarding claims 4 and 8, Brenner teaches an event that further work items are received

after the task is scheduled and prior to execution of the task, the step of executing the task

comprises processing all the received work items (column 3, line 19-42, column 4, lines 22-39,

i.e. "a new interrupt is raised and handled by CPU3 **120**. assuming the interrupt required the

same resource as interrupt **110**, interrupt **120** is added to the queue for deferred processing and

CPU3 goes on to other work," "process executes to completion....at completion, the system

checks the deferred queue whether or not deferred interrupts exist").

12.   Regarding claim 9, Brenner teaches the interrupt generating means and processing means

are embodied in a data storage controller and the work items comprise data transfer requests

from an attached host system (column 1, lines 33-53, i.e. "the peripheral devices such as disks,

tapes, and to a lesser extent memory").

13.   Claims 12-14 are rejected under both 35 U.S.C. 102(a) and 35 U.S.C. 102(e)(2) as being

anticipated by U.S. Patent No. 5,933,598 to Scales et al., hereinafter Scales.

14.   As per claim 12, Scales teaches a new method of processing work items in a data

processing system, comprising:

        effectively providing an interrupt-based mechanism for processing work items, when the

system utilization is low with respect to work items (column 13, lines 60-65); and,

effectively providing a polling-based mechanism for processing work items, when system utilization is relatively high with respect to work items (column 13, line 45 to column 14, line 13).

15.   With regards to claim 13, Scales teaches wherein work item are received in accordance with at least one device driver associated with a host system (column 3, lines 3-30, i.e. workstations sharing resources in a shared environment, "programs executing on any of the workstations").

16.   Regarding claim 14, Scales teaches wherein the data processing system comprises a storage controller (column 3, liens 6-23, column 4, lines 28-58).

Conclusion

17.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to interrupt processing, such as:

United States Patent No. 5,995,745 to Yodaiken, which is cited to show how interrupts are handled in a real-time operating system.

United States Patent No. 5,469,571 to Bunnell, which is cited to show operating system architecture using multiple priority light weight kernel task based interrupt handling.

United States Patent No. 5,606,703 to Brady et al., which is cited to show interrupt protocol system and method of using priority-arranged queues of interrupt status block control data structures.

United States Patent No. 5,560,018 to Macon, Jr. et al., which is cited to show providing external interrupt serialization compatibility in a multiprocessing environment for software written to run in a uniprocessor environment.

United States Patent No. 5,911,065 to Williams et al., which is cited to show providing cooperative interrupts in a preemptive task scheduling environment.

United States Patent No. 5,950,228 to Scales et al., which is cited to show variable-grained memory sharing for clusters of symmetric multiprocessors using private and shared state tables.

18.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian La Forgia whose telephone number is (571) 272-3792. The examiner can normally be reached on Monday thru Thursday 7-5.

19.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

20.   Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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